United States
Environmental Protection Agency

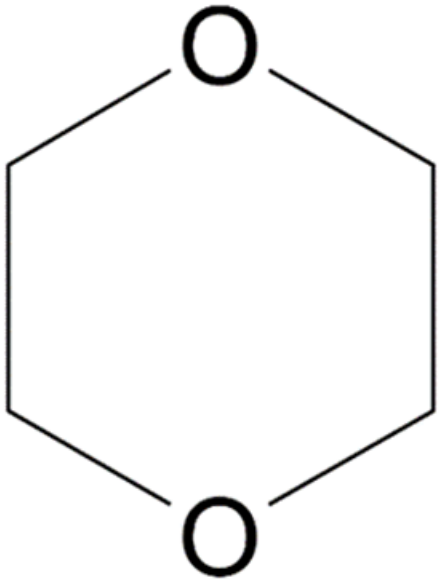
Office of Chemical Safety and
Pollution Prevention

Risk Evaluation for 1,4-Dioxane

Systematic Review Supplemental File:

Data Quality Evaluation of
Environmental Releases and Occupational Exposure Data

CASRN: 123-91-1



June 2019

This document is a compilation of tables for the data extraction and evaluation for 1,4-Dioxane. Each table shows the data point or set or information element that was extracted and evaluated from a data source in accordance with Appendix D of the Application of Systematic Review in TSCA Risk Evaluations. If the source contains more than one data set or information element, the review provides an overall confidence score for each data set or information element that is found in the source. Therefore, it is possible that a source may have more than one overall quality/ confidence score.

Table of Contents

Explanatory Notes

These explanatory notes provide context to understand the short comments in the data evaluation tables.

Domain	Metric	Description of Comments Field
Reliability	Methodology	Indicates the sampling/analytical methodology, estimation method, or type of publication
Representativeness	Geographic Scope	Indicates the country of the study, publication, or underlying data
	Applicability	Indicates whether the data are for a condition of use within scope of the Risk Evaluation
	Temporal Representativeness	Provides the year of study, publication, or underlying data
	Sample Size	Describes the distribution of the sample or underlying data
Accessibility / Clarity	Metadata Completeness	Describes the completeness of the metadata
Variability and Uncertainty	Metadata Completeness	Indicates if study or publication addresses variability and uncertainty of the data or information

Releases to the Environment

Source Citation:	Nicnas,. 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3827412

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Commercial Use
Life Cycle Description (Subcategory of Use):	Lab use
Release Days per Year:	50
Waste Treatment Method:	Sewage Treatment Plant

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NICNAS
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Australia
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1998
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Nicnas,. 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3827412

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Commercial, Potential Consumer Use
Life Cycle Description (Subcategory of Use):	Film processing (film cement use)
Release Days per Year:	50
Number of Sites:	10
Waste Treatment Method:	Sewage Treatment Plant

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NICNAS
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Australia
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1998
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Nicnas,. 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3827412

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Processing
Life Cycle Description (Subcategory of Use):	Pharmaceutical manufacture
Release Days per Year:	50
Number of Sites:	1
Waste Treatment Method:	Sewage Treatment Plant

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NICNAS
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Australia
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1998
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Carex, Canada. 2017. Profiles & estimates: 1,4-Dioxane.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3978382

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Industrial Use
Life Cycle Description (Subcategory of Use):	Basic chemical mfg
Annual Release Quantity (kg/yr):	5 tonnes

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	National Pollutant Release Inventory (NPRI)
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Canada
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty
Overall Quality Determination†			High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2014. Toxic release inventory: 1,4-Dioxane.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3860452

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Disposal
Release Source:	All industries
Disposal /Treatment Method:	Underground Injection Wells, Landfills, Air
Environmental Media:	Water, land, air
Release or Emission Factor:	RY2015 TRI releases, multiple release and disposal categories
Release Estimation Method:	Self-reported by industry for TRI
Annual Release Quantity (kg/yr):	1,291,650 lb/yr total on- and off-site disposal or other release

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US EPA, TRI, 'trusted source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	Low	× 1	3	No statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Includes most critical metadata, TRI methodology can be reviewed separately
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	1996. Solvents study.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3860540

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Processing, Use, Disposal
Release Source:	Multiple, see p. 37
Disposal /Treatment Method:	Incineration, energy recovery, fuel blending, WWT - tanks, POTW, WWT, Unspecified disposal
Environmental Media:	Land, water, air
Release or Emission Factor:	Contains reported volumes and total loading by waste type (waste waters, solids, organic waste)
Release Estimation Method:	Facility reporting, 1993 RCRA 3007 Questionairre
Annual Release Quantity (kg/yr):	207 million kg/yr, see p. 41 for brekadown by management practice
Number of Sites:	27
Waste Treatment Method:	Multiple

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US EPA Solvents Study, trusted source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Low	× 2	6	1993 RCRA 3007 Questionairre
	Metric 5:	Sample Size	Low	× 1	3	Distribution of samples is qualitative or characterized by no statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty

Continued on next page

– continued from previous page

Source Citation:	1996. Solvents study.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3860540

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Dow Chemical, Company. 1989. Dow Chemical information submitted to EPA pursuant to section 8(e) of the Toxic Substances Contract Act (TSCA).
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3861185

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Processing, non-incorporative
Release Source:	Process solvent/stabilizer in chlorinated solvents
Disposal /Treatment Method:	Aqueous waste stream
Environmental Media:	Water
Release or Emission Factor:	Not specified
Release Estimation Method:	laboratory simulation and analysis
Waste Treatment Method:	Condensor, then transferred to solvent-waste separator; or organic vapors from degreasing opeartions may be treated by activated carbon adsorption
P2 Control & percent Efficiency:	Reports removal efficiency of activated sludge stream and carbon adsorption, see p. 27

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Dow Chemical information request response
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Low	× 2	6	1985
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is qualitative or characterized by no statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	includes most critical metadata
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty

Continued on next page

– continued from previous page

Source Citation:	Dow Chemical, Company. 1989. Dow Chemical information submitted to EPA pursuant to section 8(e) of the Toxic Substances Contract Act (TSCA).
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3861185

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		Medium		1.9	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	1995. OPPT chemical fact sheets: 1, 4-Dioxane fact sheet: Support document.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3860496

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Release Source:	TRI-reporting industries
Environmental Media:	Air, water, land
Release or Emission Factor:	1992 TRI - Total 1.13 million pounds released, 680 thousand pounds to atmosphere, 450 thousand pounds to surface waters, and 33 hundred pounds were released onto the land.
Release Estimation Method:	Self-reported by industry for TRI

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US EPA OPPT Chemical Fact Sheet, trusted source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Low	× 2	6	1995 literature search
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3809027

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Release Source:	Combined
Disposal /Treatment Method:	Incineration
Environmental Media:	Environmental releases of 1,4-dioxane to air and water may contribute to ecological and general population exposures. The potential for release of 1,4-dioxane to air is high due to the high vapor pressure of 1,4-dioxane and disposal through incineration. Industrial and commercial use of 1,4-dioxane and presence in consumer products suggest releases to water are possible
Release or Emission Factor:	Reports releases from TRI, notes generally decreasing total releases from 1988 to 2007
Release Estimation Method:	Self-reported by industry for TRI
Annual Release Quantity (kg/yr):	Multiple estimates from TRI, see document
Number of Sites:	39 to 45

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						

Continued on next page

– continued from previous page

Source Citation:	U.S, E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3809027

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†		High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Atsdr,. 2012. Toxicological profile for 1,4-dioxane.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3982333

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	All stages
Release Source:	TRI-reporting industries
Disposal /Treatment Method:	Incineration, POTW
Environmental Media:	Environmental releases of 1,4-dioxane to air and water may contribute to ecological and general population exposures. The potential for release of 1,4-dioxane to air is high due to the high vapor pressure of 1,4-dioxane and disposal through incineration. Industrial and commercial use of 1,4-dioxane and presence in consumer products suggest releases to water are possible
Release or Emission Factor:	Reports releases from TRI, notes generally decreasing total releases from 1988 to 2007
Release Estimation Method:	Self-reported by industry for TRI
Annual Release Quantity (kg/yr):	Multiple estimates from TRI, see document

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	ATSDR Toxicological Profile
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2012
	Metric 5:	Sample Size	High	× 1	1	TRI Sites
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Includes media, life cycle stage, and annual releases
Domain 4: Variability and Uncertainty						

Continued on next page

– continued from previous page

Source Citation:	Atsdr,. 2012. Toxicological profile for 1,4-dioxane.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3982333

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 7: Metadata Completeness	High	× 1	1	States that TRI data isn't 100 percent reliable since only certain sites are required to report.
Overall Quality Determination†		High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Nih,. 2016. Report on carcinogens: 1,4-Dioxane.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3982327

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	All stages
Release Source:	TRI-reporting industries
Environmental Media:	46 percent Air27 percent Surface water26 percent underground injection
Release Estimation Method:	Self-reported by industry for TRI
Annual Release Quantity (kg/yr):	309,000 lb
Number of Sites:	53

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Department of Health and Human Services NTP
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2016
	Metric 5:	Sample Size	High	× 1	1	TRI Sites
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Includes media and total releases
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Fujiwara, T.,Tamada, T.,Kurata, Y.,Ono, Y.,Kose, T.,Ono, Y.,Nishimura, F.,Ohtoshi, K.. 2008. Investigation of 1,4-dioxane originating from incineration residues produced by incineration of municipal solid waste. Chemosphere.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3579380

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Disposal
Life Cycle Description (Subcategory of Use):	Disposal
Release Source:	Incineration, landfill leachate
Release or Emission Factor:	Up to 340 ug/L detected in leachate
Number of Sites:	2 landfills3 incineration sites

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Research paper from Chemosphere
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Japan
	Metric 3:	Applicability	High	× 2	2	Scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2008
	Metric 5:	Sample Size	High	× 1	1	38 samples from landfill sites
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Includes total leachate produced/day, emission factors for diosane form samples
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Chemistry Industry Association of, Canada. 2017. All substances emissions for 2012 and projections for 2015.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3982361

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	All stages
Annual Release Quantity (kg/yr):	4.8 tonnes in 2012 (Actual)6 tonnes in 2015 (projected)
Number of Sites:	2

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Chemistry Industry Assocation of Canada
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Canada
	Metric 3:	Applicability	Low	× 2	6	Unsure what scenario data is for
	Metric 4:	Temporal Representativeness	High	× 2	2	2012
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Includes annual release for the two sites, but no other data
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty
Overall Quality Determination†			Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Chemistry Industry Association of, Canada. 2017. All substances emissions for 2011 and projections for 2014.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3982362

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	All stages
Annual Release Quantity (kg/yr):	7.25 tonnes in 2011 (actual)7.3 tonnes in 2014 (projected)
Number of Sites:	1

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Chemistry Industry Assocation of Canada
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Canada
	Metric 3:	Applicability	Low	× 2	6	Unsure what scenario data is for
	Metric 4:	Temporal Representativeness	High	× 2	2	2011
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Includes annual release for the site, but no other data
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty
Overall Quality Determination†			Medium		2.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Fl, D. E. P.. 2002. Gulf States Chemical: County Road 158: Lloyd, Florida: Jefferson County: Northeast district: Site lead: Waste cleanup program: Approved for cleanup: February 28, 2002: HWC # 131.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3986456

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Disposal
Life Cycle Description (Subcategory of Use):	Disposal
Release Source:	Runoff from leaking tanks, tank rinsate
Environmental Media:	Water
Release or Emission Factor:	7.2 ug/L detected in sampling

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Florida DEP
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2011
	Metric 5:	Sample Size	High	× 1	1	Multiple wells sampled
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Includes some sampling information, but not much information about the processes performed at the plant
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2006. Treatment Technologies for 1,4-Dioxane: Fundamentals and Field Applications.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3809053

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	All stages
Release Source:	2002 TRI Reporting industries
Environmental Media:	Water, air, land, off-site. Water is primary concern.
Annual Release Quantity (kg/yr):	1,146,641 lb/yr total (lists amounts for each media)
Number of Sites:	11 listed in table
Waste Treatment Method:	Advanced oxidation, bioremediation, adsorption (GAC)
P2 Control & percent Efficiency:	Gives table with initial and final contaminant concentrations for different sites and technologies

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA Office of Solid Waste and Emergency Response
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2006
	Metric 5:	Sample Size	High	× 1	1	TRI Sites
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Includes media and total releases
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	States that TRI data isn't 100 percent reliable since only certain sites are required to report.
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Adeq,. 2012. Tucson International Airport Area (TIAA) overview: EPA cercla site.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982201

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Processing, and use
Waste Treatment Method:	Advanced Oxidation Treatment system, Granular activated carbon (GAC) to treat contaminated groundwater

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Arizona DEQ, EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Groundwater remediation activities (out of scope)
	Metric 4:	Temporal Representativeness	High	× 2	2	2012
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - No Sampling
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - No Sampling
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.0.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Adeq,. 2017. National priorities list (NPL) sites (federal superfund): Tucson International Airport area (TIAA) overview.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982191

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Processing, and use
Waste Treatment Method:	Advanced Oxidation Treatment system, Granular activated carbon (GAC) to treat contaminated groundwater

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Arizona DEQ, EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Groundwater remediation activities (out of scope)
	Metric 4:	Temporal Representativeness	High	× 2	2	2012
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - No Sampling
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - No Sampling
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.0.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2017. Pollution prevention search results, envirofacts database.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3860453

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Multiple Subcategories
Release Source:	NAICS code provided for each site
Disposal /Treatment Method:	Pollution prevention method listed for each site
Daily Release Quantity (kg/day):	Pollution prevention method listed for each site
Annual Release Quantity (kg/yr):	Lists current year and prior year releases
Number of Sites:	51 sites in the table with Dioxane releases
Waste Treatment Method:	Pollution prevention method listed for each site
P2 Control & percent Efficiency:	Pollution prevention method listed for each site, shows decrease in emissions before and after

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	USEPA Envirofacts
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	Range: 2007-2015
	Metric 5:	Sample Size	High	× 1	1	TRI Sites
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Includes releases, NAICS, and P2/Efficiency
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Does not address variability or uncertainty
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Environment Canada, Health Canada. 2010. Screening assessment for the challenge 1,4-dioxane.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3981144

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Disposal
Life Cycle Description (Subcategory of Use):	Disposal
Release Source:	2006 TRI
Environmental Media:	air, water, underground injection
Annual Release Quantity (kg/yr):	56 tonnes air, 22 tonnes water, 64 tonnes UI

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Environment Canada/Health Canada
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2010
	Metric 5:	Sample Size	High	× 1	1	TRI Sites
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Environment Canada, Health Canada. 2010. Screening assessment for the challenge 1,4-dioxane.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3981144

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Disposal
Life Cycle Description (Subcategory of Use):	Disposal
Release Source:	2006 NPRI Canada
Environmental Media:	air, water
Annual Release Quantity (kg/yr):	13,800 kg air, 6,500 kg water

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Environment Canada/Health Canada
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Canada
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2010
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Matienzo, L. V.. 1989. Staff report on development of treatment standards for non-RCRA solvent waste.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982116

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Disposal
Life Cycle Description (Subcategory of Use):	Disposal
Waste Treatment Method:	Describes different treatment methods for non-wastewater streams based on solvent concentration in the stream

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	California Department of Health Services
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Low	× 2	6	1989
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Adeq,. 2017. National priorities list (NPL) sites (federal superfund): Air Force plant 44 (AFP-44)/Raytheon project area.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982188

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Processing, and use
Waste Treatment Method:	Advanced Oxidation Treatment system, Granular activated carbon (GAC) to treat contaminated groundwater

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Arizona DEQ, EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Groundwater remediation activities (out of scope)
	Metric 4:	Temporal Representativeness	High	× 2	2	2012
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	N/A - No Sampling
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	N/A - No Sampling
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.0.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1978. OAQPS guideline series: Control of volatile organic emissions from manufacture of synthesized pharmaceutical products.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3970050

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Industrial Use - Pharmaceuticals
Release Source:	Dryers, reactors, distillation units, storage and transfer, filters, extractors, centrifuges, crystallizers (first 4 majority of emissions)
Environmental Media:	Air, contract haul
Release Estimation Method:	Cites EPA 1977 emission factors/equations for releases from storage tanks. Also App B from process equipment.
Annual Release Quantity (kg/yr):	2 metric tons to air, 41 metric tons to contract haulEmission estimates from reactors for 4 companies with different control tech in Table 3-1 (in Mg/yr, not dioxane specific just VOCs). Other tables have emissions from other steps in process, but do not list dioxane.
Number of Sites:	800 Pharmaceutical plants in the US and territories
P2 Control & percent Efficiency:	Storage and transfer: vapor return lines, vent condensers, conservation vents, vent scrubbers, pressure tanks, carbon adsorbers, floating roofs.Everything else: Condensers, scrubbers, and carbon adsorbers. Methods for calculating efficencies in Ch.4

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA OAQPS
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Low	× 2	6	1978
	Metric 5:	Sample Size	Medium	× 1	2	Some data from 26 sites. Some information is general to all sites
Domain 3: Accessibility/Clarity						

Continued on next page

– continued from previous page

Source Citation:	U.S, E. P. A.. 1978. OAQPS guideline series: Control of volatile organic emissions from manufacture of synthesized pharmaceutical products.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3970050

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
	Metric 6: Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty - states generalizations are difficult since there is a lot of variability between plants and volumes of chemicals used
Overall Quality Determination†		High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1992. The toxics release inventory. Hazardous Waste and Hazardous Materials.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3982118

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	All stages
Annual Release Quantity (kg/yr):	1,092,862 lbs total in 1988

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA, TRI
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Low	× 2	6	General overview of TRI, Gave a total release of dioxane for one year
	Metric 4:	Temporal Representativeness	Low	× 2	6	1992
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Low		2.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	1999. Revised Risk Assessment for the Air Characteristic Study Volume I Overview.
Type of Data Source	Releases to the Environment; Published Models for Exposures or Releases;
Hero ID	1261630

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Disposal
Life Cycle Description (Subcategory of Use):	Disposal
Release Source:	Waste management units, landfill
Release Estimation Method:	CHEMDAT8 Modeling

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA, OSW
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Model for emissions from waste disposal
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1999
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	196351

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture, Processing
Life Cycle Description (Subcategory of Use):	Manufacture, Processing
Environmental Media:	air, water, incineration
Release or Emission Factor:	emission factors for different industries (Tables 3.2, 3.3, 3.5)
Release Estimation Method:	derived from US emissions factors, TRI and industry data
Daily Release Quantity (kg/day):	daily releases for different industries (Tables 3.2, 3.3, 3.5)
Release Days per Year:	days/year for different industries (Tables 3.2, 3.3, 3.5)
Number of Sites:	5

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2002
	Metric 5:	Sample Size	Medium	× 1	2	Some datasets are represented as ranges with averages and 90th percentile, some are just ranges. The report provides recommended final values, but it is unclear how they got them.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Some datasets are represented as ranges with averages and 90th percentile, some are just ranges. The report provides recommended final values, but it is unclear how they got them.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.6	

Continued on next page

– continued from previous page

Source Citation:	Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	196351

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Aca,. 2015. Re: TSCA Work Plan Chemical Problem Formulaton and Initial Assessment for 1,4-Dioxane.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3809105

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	All stages
Disposal /Treatment Method:	incineration, UI, waste broker
Environmental Media:	water, air, land
Annual Release Quantity (kg/yr):	87,166 lb/y to air19,134 to surface water1,035,300 to UI and waste broker
Number of Sites:	41

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	2015 PF (US EPA)
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2017. Pollution prevention search results, envirofacts database.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3860453

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Processing, Use, Disposal
Life Cycle Description (Subcategory of Use):	Processing, Use, Disposal
Annual Release Quantity (kg/yr):	Total releases for specific facilities, shows previous year and percent reduction.
Number of Sites:	51
P2 Control & percent Efficiency:	List pollution prevention info and percent reduction between 2 years

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EnviroFacts
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2009-2015
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Povides total release and some P2 information.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Just lists data.
Overall Quality Determination†			High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1992. The toxics release inventory. Hazardous Waste and Hazardous Materials.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3982118

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Disposal
Life Cycle Description (Subcategory of Use):	Disposal
Annual Release Quantity (kg/yr):	1,092,862 lb/yr

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA, TRI
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Low	× 2	6	Unsure what scenario data is for
	Metric 4:	Temporal Representativeness	Low	× 2	6	1987-1988
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	Provides total release for two years
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Just lists data.
Overall Quality Determination†			Low		2.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2017. Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: 1,4-Dioxane.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3986663

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	Manufacturing, processing, use
Annual Release Quantity (kg/yr):	4,224,670 lbs
Number of Sites:	25 mfg0 import13 proc21 other uses (2015 TRI)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA Use Dossier
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2017
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Lists data sources
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	N. C. State University. 2017. Identification and reduction of pollution sources in textile wet processing.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3986892

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Industrial Use - Textiles
Release or Emission Factor:	0.65 lb/hr

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Department of Textile ChemistrySchool of TextilesNorth Carolina State University
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Low	× 2	6	1986
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Usgs,. 2002. Geohydrology, Water Quality, and Simulation of Ground-Water Flow in the Vicinity of a Former Waste-Oil Refinery near Westville, Indiana, 1997"2000.
Type of Data Source	Releases to the Environment; Published Models for Exposures or Releases;
Hero ID	3827393

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Use

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	USGS, USDOI, EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	More for fate modeling than releases. Use is for waste-oil refinery (out of scope)
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2002
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.0.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2016. Micro auto gasification system: Emission characterization.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3970140

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Disposal
Life Cycle Description (Subcategory of Use):	Military waste (out of scope)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Release data for military waste (food waste, standard waste, etc). Most dioxane samples non-detect
	Metric 4:	Temporal Representativeness	High	× 2	2	2016
	Metric 5:	Sample Size	High	× 1	1	8 tests, multiple waste types
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 1.7.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	European Commission Joint Research, Centre. 2002. Summary risk assessment report: 1,4-Dioxane.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3970671

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, Processing
Life Cycle Description (Subcategory of Use):	Manufacturing, processing
Release or Emission Factor:	Summary of release information from 2002 EU Risk Assessment (HERO ID: 196351)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2002
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1990. Madison County Sanitary Landfill: 1998 Northeast Rocky Ford Rd (County Rd 591): Madison, FL: County: Madiosn: District: Northeast: Site Lead: EPA: HWC# 076.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982214

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Disposal
Life Cycle Description (Subcategory of Use):	uncertain
Disposal /Treatment Method:	landfill
Release or Emission Factor:	more than 3.2 ug/L present in onsite extraction wells
P2 Control & percent Efficiency:	neeed to put in new treatment system that can treat dioxane

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Medium	× 2	4	Disposal, but missing a lot of useful information
	Metric 4:	Temporal Representativeness	High	× 2	2	2016
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1986. Peak Oil-Bay Drum Company: State Rd 574 and Faulkenburg Rd: Tampa, FL: County: Hillsborough: District: Southwest: Site lead: EPA HWC# 021.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982213

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Disposal
Life Cycle Description (Subcategory of Use):	Disposal
Release Source:	Drum Recycling, then a depository for roofing shingles and construction debris
Release or Emission Factor:	Up to 390 ug/L in area monitoring wells

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability					
	Metric 1: Methodology	High	× 1	1	EPA
Domain 2: Representative					
	Metric 2: Geographic Scope	High	× 1	1	US
	Metric 3: Applicability	Unacceptable	× 2	8	Releases related to 1,1,1-TCA, out of scope
	Metric 4: Temporal Representativeness	High	× 2	2	2016
	Metric 5: Sample Size	Low	× 1	3	2 samples
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	Low	× 1	3	only gives one data point
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Low	× 1	3	no discussion
Overall Quality Determination†		Unacceptable		4.0	Metric Mean Score: 2.3.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Nc, Denr. 1995. Case study: Hoechst Celanese Corporation.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982112

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Textiles

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NCDENR
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Releases related to 1,1,1-TCA, out of scope
	Metric 4:	Temporal Representativeness	Low	× 2	6	1995
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.7.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1995. 1995 Toxics release inventory public data release overview.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3982106

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	All stages
Release or Emission Factor:	TRI releases from 1995

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	TRI data include occupational scenarios within scope, although data not broken down by sites or industries.
	Metric 4:	Temporal Representativeness	Low	× 2	6	1995
	Metric 5:	Sample Size	High	× 1	1	TRI Sites
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	TRI data only include release media; no other metadata included.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Sherry, S.,Belliveau, M.,Donegan, D.,Gianolini, K.,Sivas, D.. 1985. High tech and toxics: A guide for local communities.
Type of Data Source	Releases to the Environment; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982107

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Disposal
Release Source:	BASF facility in Bedofrd, MA

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Golden Empire Health Planning Center
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Does not provide engineering information. More relevant for community exposures
	Metric 4:	Temporal Representativeness	Low	× 2	6	1985
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.8.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1993. Categories of released chemicals reported to the Toxic Release Inventory: 1990 data.
Type of Data Source	Releases to the Environment; Environmental Release Data;
Hero ID	3982108

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	All stages
Release or Emission Factor:	TRI releases from 1990

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	TRI data include occupational scenarios within scope.
	Metric 4:	Temporal Representativeness	Low	× 2	6	1990
	Metric 5:	Sample Size	High	× 1	1	TRI Sites
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	TRI data only include release media; no other metadata included.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Sapphire, Group. 2007. Voluntary Children"s Chemical Evaluation Program [VCCEP]. Tiers 1, 2, and 3 Pilot Submission For 1,4-Dioxane.
Type of Data Source	Releases to the Environment; Completed Exposure or Risk Assessments;
Hero ID	3809038

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	All stages
Release or Emission Factor:	233,349 lb. wasreleased directly to the environment (38.4 percent to water, 49.3 percent to air and 12.4 percent to land)
Annual Release Quantity (kg/yr):	821,067 lbs (2004)
Number of Sites:	51

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Ferro Corp submission for VCCEP
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	TRI data include occupational scenarios within scope, although data not broken down by sites or industries.
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2007
	Metric 5:	Sample Size	High	× 1	1	TRI Sites
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	TRI data only include release media; no other metadata included.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Occupational Exposure

Source Citation:	Niosh,. 1977. Criteria for a recommended standard occupational exposure to dioxane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	62937

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture of Dioxane
Physical Form:	Liquid
Exposure Concentration (Unit):	1,000 - 2,000 ppm200 - 300 ppm
Number of Sites:	4
Number of Workers:	2,500 in the US exposed (not including 1,1,1-trichloroethane mfg)
Exposure Duration:	3-5 min15 min

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH report
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Medium	× 2	4	occupational scenario within the scope of the risk evaluation - "exposure data" is from toxicology studies, not worker exposure during manufacture
	Metric 4:	Temporal Representativeness	Low	× 2	6	1977
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Nicnas,. 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3827412

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Commercial Use
Life Cycle Description (Subcategory of Use):	Lab use
Physical Form:	Not specified
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	1.8 ppm (highest)
Type of Measurement or Method:	TWA
Worker Activity:	solvent extraction and TLC
Type of Sampling:	personal monitoring
Engineering Control & percent Exposure Reduction:	film cupboards/hoods, dilution ventilation

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NICNAS
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Australia
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1998
	Metric 5:	Sample Size	N/A		N/A	N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Nicnas,. 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3827412

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Commercial, potential consumer use
Life Cycle Description (Subcategory of Use):	Film Cement
Physical Form:	Not specified
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	<1ppm
Type of Measurement or Method:	pbz
Worker Activity:	Film cement application
PPE:	No PPE used

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NICNAS
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Australia
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1998
	Metric 5:	Sample Size	N/A		N/A	N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	ToxNet Hazardous Substances Data, Bank. 2017. HSDB: 1,4-Dioxane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970270

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Industrial Use
Physical Form:	Not specified
Route of Exposure:	Inhalation, dermal
Number of Workers:	50-99 per plant429,330 in the US

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	2012 TSCA IUR Data (per plant data), NIOSH NOES (Total worker data)
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Industrial Use
	Metric 4:	Temporal Representativeness	Low	× 2	6	NIOSH NOES from 1981-1983
	Metric 5:	Sample Size	Medium	× 1	2	2012 TSCA IUR Data (per plant data), NIOSH NOES (Total worker data)
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion/not applicable
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hhs,. 1978. Occupational health guideline for dioxane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3978118

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Industrial Use
Life Cycle Description (Subcategory of Use):	Textile processing; Wood pulping; Histology; Scintillation
Physical Form:	Not specified
Engineering Control & percent Exposure Reduction:	Textile processing, Wood pulping: Local exhaust ventilation, general dilution ventilationHistology: local exhaust ventilationScintillation: General dilution ventilation

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH and OSHA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Wetting and dispersing agent in textiles, wood pulping, preparation of histological samples, and liquid scintillation medium
	Metric 4:	Temporal Representativeness	Low	× 2	6	1978
	Metric 5:	Sample Size	N/A		N/A	N/A - no sampling data
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion/not applicable
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Carex, Canada. 2017. Profiles & estimates: 1,4-Dioxane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3978382

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Industrial Use
Life Cycle Description (Subcategory of Use):	Packaging final products
Physical Form:	Not specified
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	40 mg/m3
Type of Measurement or Method:	European Model
Worker Activity:	Mixing and bagging final products
Number of Workers:	3,600 Canadians exposed in the workplace

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	CAREX Canada
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Canada
	Metric 3:	Applicability	High	× 2	2	Industrial Use
	Metric 4:	Temporal Representativeness	High	× 2	2	2016
	Metric 5:	Sample Size	N/A		N/A	N/A - no sampling data
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Mentions a "European occupational exposure assessment" for the models, but doesn"t specify the assessment or the models
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion/not applicable
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Carex, Canada. 2017. 1,4-Dioxane– Occupational Estimate.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3978383

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Industrial Use
Physical Form:	Not specified
Number of Workers:	Basic Chem MFG - 200Plastic product MFG - 200

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	CAREX Canada
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Canada
	Metric 3:	Applicability	High	× 2	2	Industrial Use
	Metric 4:	Temporal Representativeness	High	× 2	2	2017
	Metric 5:	Sample Size	N/A		N/A	N/A - no sampling data
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Assessment or report clearly documents results, methods, and assumptions. Data sources are generally described but not fully transparent.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	The assessment does not address variability or uncertainty.
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Buffler, P. A.,Wood, S. M.,Suarez, L.,Kilian, D. J.. 1978. Mortality follow-up of workers exposed to 1,4-dioxane. Journal of Occupational and Environmental Medicine.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	62914

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing
Physical Form:	Not specified
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	< 25 ppm (estimation)
Number of Sites:	1
Worker Activity:	Describes exposure to three groups - 1) control operators who monitor operations in open-air plant from enclosed room, also take samples; 2) loading operators (to tank cars); 3) maintenance personnel who repair equipment
Number of Workers:	100

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Journal of Occupational Medicine, trusted source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	direct occupational scenario
	Metric 4:	Temporal Representativeness	Low	× 2	6	1978
	Metric 5:	Sample Size	High	× 1	1	Full characterization
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clearly documented
Overall Quality Determination†			High		1.4	

Continued on next page

– continued from previous page

Source Citation:	Buffler, P. A.,Wood, S. M.,Suarez, L.,Kilian, D. J.. 1978. Mortality follow-up of workers exposed to 1,4-dioxane. Journal of Occupational and Environmental Medicine.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	62914

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Buffler, P. A.,Wood, S. M.,Suarez, L.,Kilian, D. J.. 1978. Mortality follow-up of workers exposed to 1,4-dioxane. Journal of Occupational and Environmental Medicine.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	62914

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Processing
Physical Form:	Not specified
Route of Exposure:	inhalation
Exposure Concentration (Unit):	< 25 ppm (estimation)
Number of Sites:	1
Worker Activity:	Dioxane processing subunit within vinyl-chloride vinyldiene department
Number of Workers:	65

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Journal of Occupational Medicine, trusted source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	direct occupational scenario
	Metric 4:	Temporal Representativeness	Low	× 2	6	1978
	Metric 5:	Sample Size	High	× 1	1	Full characterization
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clearly documented
Overall Quality Determination†			High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Jezewska, A.,SzewczyÅska, M.,WoÅºnica, A.. 2014. [Occupational exposure to airborne chemical substances in paintings conservators]. Medycyna Pracy.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2539080

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Painting Studio
Physical Form:	Vapor
Route of Exposure:	inhalation
Exposure Concentration (Unit):	110 to 1,055 mg/m3 depending on activity
Number of Samples:	5
Number of Sites:	2
Type of Measurement or Method:	GC-FID
Worker Activity:	cleaning of the frame, cleaning of image
Type of Sampling:	Sampling tube, methods listed

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	OECD source. OECD nations expected to use acceptable methods.
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	OECD, Poland
	Metric 3:	Applicability	Unacceptable	× 2	8	Out of scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2014
	Metric 5:	Sample Size	Low	× 1	3	Unclear - most of paper is not in English
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Unacceptable	× 1	4	Most of paper is not in English; therefore, needed metadata are not provided.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Unclear - most of paper is not in English

Continued on next page

– continued from previous page

Source Citation:	Jezewska, A.,SzewczyÅska, M.,WoÅºnica, A.. 2014. [Occupational exposure to airborne chemical substances in paintings conservators]. Medycyna Pracy.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	2539080

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		Unacceptable		4.0	Metric Mean Score: 2.7.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, two of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2017. Chemical data reporting: 1,4-Dioxane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3860451

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing
Physical Form:	liquid
Number of Sites:	1
Number of Workers:	50 to 99

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US EPA CDR, trusted source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2017
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	CDR Site data - underlying methods, sources, assumptions not transparaent
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion/not applicable
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3809027

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing
Physical Form:	Vapor
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	TWA: typical - 0.2 mg/m3; worst case 10 mg/m3
Type of Measurement or Method:	TWA

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clearly documented - this data point exists within a range (see other data from this source)
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3809027

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Processing
Physical Form:	Vapor
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	TWA: typical - 40 mg/m3; worst case 180 mg/m3
Type of Measurement or Method:	TWA

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clearly documented - this data point exists within a range (see other data from this source)
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3809027

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Cleaning agent
Physical Form:	Vapor
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	TWA: typical - 15 mg/m3; worst case 50 mg/m3
Type of Measurement or Method:	TWA

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clearly documented - this data point exists within a range (see other data from this source)
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3809027

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Paint
Physical Form:	Vapor
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	TWA: typical - 2 mg/m3; worst case 11 mg/m3
Type of Measurement or Method:	TWA

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clearly documented - this data point exists within a range (see other data from this source)
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3809027

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Lab Solvent
Physical Form:	Vapor
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	TWA: typical - 5 mg/m3; worst case 25 mg/m3
Type of Measurement or Method:	TWA

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clearly documented - this data point exists within a range (see other data from this source)
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2017. Information on the various spray polyurethane foam products.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970070

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Spray polyurethane foam
Physical Form:	Aerosol, Vapor, Dust
Route of Exposure:	Inhalation, dermal
Worker Activity:	" During application " After application " During heat-generating processes such as drilling, welding, or sanding " During fires
Engineering Control & percent Exposure Reduction:	-Ventilation and contianment practices-Special procedures for permit required confined spaces
PPE:	- 2 Component HP: Supplied air respirator, eye protection, chemical resistant clothing and gloves- 2-Component LP: Air purifying respirator, eye protection, chemical resistant clothing and gloves- OCF: eye protection, chemical resistant clothing and gloves

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2016
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	Document does not address variability or uncertainty

Continued on next page

– continued from previous page

Source Citation:	U.S, E. P. A.. 2017. Information on the various spray polyurethane foam products.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970070

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		High		1.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Nrc,. 1981. Prudent practices for handling hazardous chemicals in laboratories.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982104

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Laboratory
Route of Exposure:	Inhalation, dermal
Engineering Control & percent Exposure Reduction:	Recommended: Hood
PPE:	Recommended: Nitrile rubber for gloves and other materials

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	National Research Council
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Low	× 2	6	1981
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	Clearly documented
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Oehha,. 2007. Occupational health hazard risk assessment project for California: Identification of chemicals of concern, possible risk assessment methods, and examples of health protective occupational air concentrations.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3982225

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	All life cycle stages

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	California Environmental Protection Agency Office of Environmental Health
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Doesn't provide data applicable to risk assessment (primarily provides recommended exposure limits)
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2007
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.0.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Atsdr,. 2009. Health consultation: Indoor air quality: Raytheon area: St. Petersburg, Pinellas County, Florida: EPA facility ID: FLD004100152, Part 2.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982212

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Processing/use
Life Cycle Description (Subcategory of Use):	Processing/use

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Florida Department of Health
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Exposure data for general population. Didn"t end up sampling for 1,4-dioxane
	Metric 4:	Temporal Representativeness	High	× 2	2	2009
	Metric 5:	Sample Size	High	× 1	1	Full characterization
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 1.7.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Osha,. 2004. Personal protective equipment.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3978348

EXTRACTION

Parameter	Data
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	All life cycle stages
PPE:	General information about types of PPE use in industry. Not chemical or process-specific.

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	OSHA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Low	× 2	6	Very general description of recommendations for PPE in industry. Nothing specific to dioxane.
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2004
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1978. OAQPS guideline series: Control of volatile organic emissions from manufacture of synthesized pharmaceutical products.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970050

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Industrial Use - Pharmaceuticals
Number of Sites:	800 Pharmaceutical plants in the US and territories
Number of Workers:	Usually < 25 employees per site

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA OAQPS
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Low	× 2	6	1978
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty - states generalizations are difficult since there is a lot of variability between plants and volumes of chemicals used
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	196351

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	All life cycle stages
PPE:	Exposure assessed without taking into account influence of PPE. But, PPE is likely to reduce exposure by 85 percent for dermal and 90 percent for inhalation

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2002
	Metric 5:	Sample Size	Medium	× 1	2	Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	196351

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture of Dioxane
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	Provides data from different tasks (storage, repair, sytheses, etc) (Table 4.1). Also estimates exposure using modeling.
Number of Samples:	5 sets of data, with n ranging from 1 to 305 for each set
Type of Measurement or Method:	EASE Model and sampling
Worker Activity:	Production, sampling, drumming, cleaning, and maintenance.
Type of Sampling:	area and personal sampling
Exposure Duration:	6-8 hr for full shift, 0-0.5 hr for short term
Exposure Frequency:	225 days/year

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2002
	Metric 5:	Sample Size	Medium	× 1	2	Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty

Continued on next page

– continued from previous page

Source Citation:	Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	196351

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	196351

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Processing/use
Life Cycle Description (Subcategory of Use):	Formulation of products containing 1,4-dioxane
Route of Exposure:	Inhalation and dermal
Exposure Concentration (Unit):	worst case inhalation: 180 mg/m3Typical inhalation: 40 mg/m3Dermal: 420 mg./m3
Number of Sites:	1
Type of Measurement or Method:	EASE model
Worker Activity:	adding ofthe substance to a mixture, mixing and finally drumming or bagging of the product. In case of1,4-dioxane the highest exposure probably occurs during adding of the substance and drummingof the product.
Exposure Duration:	6-8 hr for full shift
Exposure Frequency:	225 days/year

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2002
	Metric 5:	Sample Size	Medium	× 1	2	Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty

Continued on next page

– continued from previous page

Source Citation:	Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	196351

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	196351

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	End use of 1,4-dioxane or the product contianing 1,4-dioxane
Route of Exposure:	Inhalation and dermal
Exposure Concentration (Unit):	Exposure data available, estimates from modeling
Number of Samples:	5 data sets, n=1 to 305 for each
Type of Measurement or Method:	EASE and sampling
Worker Activity:	medicine mfg, pharmaceutical production, use as a solvent
Type of Sampling:	stationary and personal samples
Exposure Duration:	6-8 hr for full shift, 0-0.5 hr for short term
Exposure Frequency:	225 days/year

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2002
	Metric 5:	Sample Size	Medium	× 1	2	Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.4	

Continued on next page

– continued from previous page

Source Citation:	Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	196351

EVALUATION

Domain	Metric	Rating	MWF⋆	Score	Comments

⋆ MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Aca,. 2015. Re: TSCA Work Plan Chemical Problem Formulaton and Initial Assessment for 1,4-Dioxane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3809105

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	All life cycle stages
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	summarizes exposure data from ECB 2002 (HERO ID 196351)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	2015 PF (US EPA)
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Cameo, Chemicals. 2016. Chemical datasheet: dioxane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3981005

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	All life cycle stages
PPE:	Generic PPE recommendations

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	CAMEO Chemicals (NOAA)
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	General information that likely applies to all scenarios
	Metric 4:	Temporal Representativeness	High	× 2	2	2017
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Fishbein, L.. 1981. Carcinogenicity and mutagenicity of solvents I Glycidyl ethers, dioxane, nitroalkanes, dimethylformamide and allyl derivatives. Science of the Total Environment.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	61633

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	All life cycle stages

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	U.S. Dept. of Health and Human Sciences, Food & Drug Administration
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Primarily use as a stabilizer for TCE, which is out of scope. Mostly health information.
	Metric 4:	Temporal Representativeness	Low	× 2	6	1981
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.7.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. 1994. NIOSH pocket guide to chemical hazards.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	2328101

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	All life cycle stages
PPE:	Generic PPE recommendations

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	General information that likely applies to all scenarios
	Metric 4:	Temporal Representativeness	Low	× 2	6	1994
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Kupczewska-Dobecka, M.,Czerczak, S.,Jakubowski, M.,Maciaszek, P.,Janasik, B.. 2010. [Application of predictive model to estimate concentrations of chemical substances in the work environment]. Medycyna Pracy.
Type of Data Source	Occupational Exposure; Published Models for Exposures or Releases;
Hero ID	2583051

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	All life cycle stages
Type of Measurement or Method:	Potentially information about EASE Model, but not in English

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EASE Model, used by EU
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	Unacceptable	× 2	8	Unknown - paper in different language, but likely applicable. In any case, this source is not useful.
	Metric 4:	Temporal Representativeness	High	× 2	2	2010
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.2.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Burton, N. C.,Driscoll, R. J.. 1997. Health hazard evaluation report no. HETA-95-0293-2655, Dana Corporation, Spicer Axle Division, Fort Wayne, Indiana.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3859373

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	MWF
Exposure Concentration (Unit):	0.14 to 0.23 mg/m3 (area)0.24 to 0.53 (PBZ)These are exposures to MWF, not dioxane specifically
Number of Samples:	6 PBZ, 4 area
Worker Activity:	Threader, broaching, Apex drill, lunch tables (for area)Transfer lines, roughing, four-way, multiple, screw machine-lathing, and apex drill (for pbz)
Type of Sampling:	area and personal sampling
Exposure Duration:	7 hours sample time
Analytic Method:	NIOSH Method 0500 - PVC filters at 2 L/min

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH HHE
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Medium	× 2	4	Scenario is within the scope, but samples are for MWF, not Dioxane. Could possible still use data to estimate dioxane exposures from MWF use
	Metric 4:	Temporal Representativeness	Low	× 2	6	1997
	Metric 5:	Sample Size	High	× 1	1	workers sampled at the factory
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty

Continued on next page

– continued from previous page

Source Citation:	Burton, N. C.,Driscoll, R. J.. 1997. Health hazard evaluation report no. HETA-95-0293-2655, Dana Corporation, Spicer Axle Division, Fort Wayne, Indiana.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3859373

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Haz, Map. 2017. Haz-Map: Agent name: 1,4-Dioxane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970253

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	All stages
Life Cycle Description (Subcategory of Use):	All stages

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	TOXNet/Hazmap
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Some physical property and health information, but not exposure
	Metric 4:	Temporal Representativeness	High	× 2	2	2016
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.0.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	196351

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	All stages
Life Cycle Description (Subcategory of Use):	All life cycle stages
Exposure Concentration (Unit):	Summary of exposure data from 2002 EU Risk Assessment (HERO ID: 196351)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2002
	Metric 5:	Sample Size	Medium	× 1	2	Some datasets are presented as ranges with arithmetic averages and 90th percentile. Some are just presented as ranges with no additional data.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Echa,. 2017. Uses by professional workers: 1,4-Dioxane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970673

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	Manufacturing, processing, use
Worker Activity:	List of generic uses and generic worker activites, but no data.

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	ECHA/REACH
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	Unacceptable	× 2	8	Generic use descriptions, no useful information
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Unknown, but probably recent
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.5.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Iarc,. 1999. IARC Monographs on the evaluation of carcinogenic risks to humans: 1,4-Dioxane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970850

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	All stages
Life Cycle Description (Subcategory of Use):	All life cycle stages
Route of Exposure:	inhalation, oral. Poor skin penetration
Exposure Concentration (Unit):	No data were available to the Working Group

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	IARC
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	No exposure or release data. Lots of human health data
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1999
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.3.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. 2013. 1, 4- Dioxane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3978115

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	All stages
Life Cycle Description (Subcategory of Use):	All stages

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Physical properties
	Metric 4:	Temporal Representativeness	Medium	× 2	4	Unknown, but probably recently updated
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.3.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. Dioxane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3978116

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	All stages
Life Cycle Description (Subcategory of Use):	All stages
Route of Exposure:	inhalation, skin absorption, ingestion, skin and/or eye contact

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Pocket guide, physical properties and health information
	Metric 4:	Temporal Representativeness	High	× 2	2	2016
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.0.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,,Dpse,. 1994. Dioxane, Part 2.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3978117

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	All stages
Life Cycle Description (Subcategory of Use):	All life cycle stages
Type of Measurement or Method:	NIOSH Method 1602

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	NIOSH method for sampling dioxane, but no exposure data
	Metric 4:	Temporal Representativeness	Low	× 2	6	1994
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.7.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Echa,. Links to registration dossiers.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	4121210

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	All stages
Life Cycle Description (Subcategory of Use):	All life cycle stages

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	ECHA/REACH
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	Unacceptable	× 2	8	Generic worker descriptions, but not useful
	Metric 4:	Temporal Representativeness	High	× 2	2	2017
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.2.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. 2011. NIOSH manual of analytical methods: Formic acid.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3986439

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	All stages
Life Cycle Description (Subcategory of Use):	All life cycle stages
Type of Measurement or Method:	NIOSH Method 2011 for Formic Acid

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	NIOSH method for sampling formic acid. Uses dioxane as an optional reagent, but no exposure data
	Metric 4:	Temporal Representativeness	Low	× 2	6	1994
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.7.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. 2010. Monitoring data in workers from health evaluations.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3986437

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Deepwater Horizon Response workers
Exposure Concentration (Unit):	all but one non-detect (0.2 ppb)
Number of Samples:	17
Number of Sites:	6 locations
Type of Measurement or Method:	EPA TO-15 Summa; General Area sampling
Worker Activity:	Various activities related to oil spill cleanup (dispersant operations and in-situ burning)
Exposure Duration:	30-480 min

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability					
	Metric 1: Methodology	High	× 1	1	NIOSH
Domain 2: Representative					
	Metric 2: Geographic Scope	High	× 1	1	US
	Metric 3: Applicability	Unacceptable	× 2	8	Out of scope
	Metric 4: Temporal Representativeness	High	× 2	2	2010
	Metric 5: Sample Size	High	× 1	1	Samples of various activities
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†		Unacceptable		4.0	Metric Mean Score: 1.9.

Continued on next page

– continued from previous page

Source Citation:	Niosh,. 2010. Monitoring data in workers from health evaluations.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3986437

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	T. Ryan, D. Hubbard. 2016. 3-D Printing Hazards: Literature Review & Preliminary Hazard Assessment.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5080530

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Printing
Route of Exposure:	inhalation
Exposure Concentration (Unit):	27 ppbv
Number of Samples:	1
Number of Sites:	1
Type of Measurement or Method:	1.4-L TO-15 canister
Worker Activity:	placed directly adjacent to the 3-D printer, with a short (1 ft) piece of Tygon tubingfixed to the inlet of the canister extendinginto the 3-D printer point of operation,underneath the hinged, unventilatedand interlocked guard.
Exposure Duration:	8 hours
Engineering Control & percent Exposure Reduction:	Provide local exhaust ventilation system. Ventilation should be sufficient to effectively remove andprevent buildup of any dusts or fumes that may be generated during handling or thermal processing.

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Study authors are qualified, sampling method well described, and authors used an accredited IH lab for analysis.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	3D Printing
	Metric 4:	Temporal Representativeness	High	× 2	2	2016
	Metric 5:	Sample Size	Medium	× 1	2	only one sample
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Describes sample point
Domain 4: Variability and Uncertainty						

Continued on next page

– continued from previous page

Source Citation:	T. Ryan, D. Hubbard. 2016. 3-D Printing Hazards: Literature Review & Preliminary Hazard Assessment.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5080530

EVALUATION

Domain	Metric	Rating	MWF⋆	Score	Comments
	Metric 7: Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†		High		1.2	

⋆ MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Osha,. 2016. Chemical exposure health data: Full data set.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3986510

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	unknown
Life Cycle Description (Subcategory of Use):	unknown

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	OSHA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Looks like it should be an excel file with exposure data, but it's all smooshed together in a text file and not useful
	Metric 4:	Temporal Representativeness	Medium	× 2	4	unknown, but probably recent
	Metric 5:	Sample Size	High	× 1	1	CEHD
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.1.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	CalEpa,. 2005. Appendix D.3 Chronic RELS and toxicity summaries using the previous version of Hot Spots Risk Assessment guidelines (OEHHA 1999).
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982628

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	All stages
Life Cycle Description (Subcategory of Use):	All life cycle stages

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	OEHHA
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Human Health, physical properties data
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1999
	Metric 5:	Sample Size	High	× 1	1	CEHD
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.1.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ndcee,. 1998. Engineering and technical services for join group on acquisition pollution prevention (JG-APP) pilot projects: Potential alternatives report JP-A-1-1: Alternatives to lead-containing dry film lubricants for antigalling/antifretting, anti-seizing, and assembly aid application.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982114

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Lubricant

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	National Defense Center for Environmental Excellence
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Dry film lubricants for primariliy aerospace applications
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1998
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hanley, K.,Trout, D.,Burt, S.,Mouradian, R.. 1995. Health hazard evaluation report no. HETA-90-0277-2487, Johnson Controls, Greenfield, Ohio.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3859370

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	car seat mfg

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Use not in scope, related to 1,1,1-TCA. Polyurethane foam, but not spray application
	Metric 4:	Temporal Representativeness	Low	× 2	6	1995
	Metric 5:	Sample Size	High	× 1	1	119 shift workers
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	qualitative assessment, not PBZ, Area samples, etc
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	qualitative assessment, not PBZ, Area samples, etc
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.6.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Krake, A. M.,Herrera-Moreno, V.. 1995. Health hazard evaluation report no. HETA-95-0296-2547, Automotive Controls Corporation, Independence, Kansas.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3859374

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Vapor degreasing
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	1.5 to 13.3 ppm (pbz)11.8 ppm (STEL)2.5 to 51 ppm (Area)
Number of Samples:	21 pbz12 area
Number of Sites:	1
Worker Activity:	various activities, tray cleaning
Exposure Duration:	full-shift15-min

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability					
	Metric 1: Methodology	High	× 1	1	NIOSH
Domain 2: Representative					
	Metric 2: Geographic Scope	High	× 1	1	US
	Metric 3: Applicability	Unacceptable	× 2	8	Vapor degreasing with 1,1,1-TCE, not in scope
	Metric 4: Temporal Representativeness	Low	× 2	6	1995
	Metric 5: Sample Size	High	× 1	1	21 pbz12 area
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†		Unacceptable		4.0	Metric Mean Score: 2.1.

Continued on next page

– continued from previous page

Source Citation:	Krake, A. M.,Herrera-Moreno, V.. 1995. Health hazard evaluation report no. HETA-95-0296-2547, Automotive Controls Corporation, Independence, Kansas.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3859374

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Hills, B.,Klincewicz, S.,Blade, L. M.,Sack, D.. 1989. Health hazard evaluation report no. HETA-87-367-1987, BMY Corporation, A Division of Harsco Corporation, York, Pennsylvania.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3859375

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Touch-up paint
Route of Exposure:	inhalation
Exposure Concentration (Unit):	n.d. to 1.7 ppm (pbz)
Number of Samples:	17 pbz
Number of Sites:	1
Worker Activity:	various activities
Exposure Duration:	full-shift

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability					
	Metric 1: Methodology	High	× 1	1	NIOSH
Domain 2: Representative					
	Metric 2: Geographic Scope	High	× 1	1	US
	Metric 3: Applicability	Unacceptable	× 2	8	not in scope
	Metric 4: Temporal Representativeness	Low	× 2	6	1987
	Metric 5: Sample Size	High	× 1	1	17 pbz
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†		Unacceptable		4.0	Metric Mean Score: 2.1.

Continued on next page

– continued from previous page

Source Citation:	Hills, B.,Klincewicz, S.,Blade, L. M.,Sack, D.. 1989. Health hazard evaluation report no. HETA-87-367-1987, BMY Corporation, A Division of Harsco Corporation, York, Pennsylvania.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3859375

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Love, J. R.,Kern, M.. 1981. Health hazard evaluation report no. HETA-81-065-938, METRO Bus Maintenance Shop, Washington, DC.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3859376

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Degreasing
Route of Exposure:	inhalation
Exposure Concentration (Unit):	3 n.d.7 not analyzed for dioxane
Number of Samples:	10 area
Number of Sites:	1
Type of Measurement or Method:	Gas Chromatography w/flame ionization

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability					
	Metric 1: Methodology	High	× 1	1	NIOSH
Domain 2: Representative					
	Metric 2: Geographic Scope	High	× 1	1	US
	Metric 3: Applicability	Unacceptable	× 2	8	not in scope
	Metric 4: Temporal Representativeness	Low	× 2	6	1981
	Metric 5: Sample Size	High	× 1	1	10 samples
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	Low	× 1	3	non-detects or not analyzed
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Low	× 1	3	non-detects or not analyzed
Overall Quality Determination†		Unacceptable		4.0	Metric Mean Score: 2.6.

Continued on next page

– continued from previous page

Source Citation:	Love, J. R.,Kern, M.. 1981. Health hazard evaluation report no. HETA-81-065-938, METRO Bus Maintenance Shop, Washington, DC.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3859376

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Fidler, A. T.,Crandall, M. S.,Kerndt, P. R.. 1988. Health hazard evaluation report no. HETA-86-051-1911, National Cover of Atlanta, Inc., Lawrenceville, Georgia.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3859377

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Silkscreening
Route of Exposure:	inhalation
Exposure Concentration (Unit):	n.d to 3.89 ppm (pbz)n.d. to 3.5 ppm (STEL)n.d. to 0.42 ppm (area)
Number of Samples:	34 pbz3 STEL24 area
Number of Sites:	1
Worker Activity:	various activities
Exposure Duration:	Full-shift

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 1: Reliability					
	Metric 1: Methodology	High	× 1	1	NIOSH
Domain 2: Representative					
	Metric 2: Geographic Scope	High	× 1	1	US
	Metric 3: Applicability	Unacceptable	× 2	8	not in scope
	Metric 4: Temporal Representativeness	Low	× 2	6	1988
	Metric 5: Sample Size	High	× 1	1	60 samples
Domain 3: Accessibility/Clarity					
	Metric 6: Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†		Unacceptable		4.0	Metric Mean Score: 2.1.

Continued on next page

– continued from previous page

Source Citation:	Fidler, A. T.,Crandall, M. S.,Kerndt, P. R.. 1988. Health hazard evaluation report no. HETA-86-051-1911, National Cover of Atlanta, Inc., Lawrenceville, Georgia.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3859377

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Reh, B. D.. 1995. Health hazard evaluation report no. HETA-94-0298, Gen Corp Automotive, Wabash, Indiana.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3970466

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	1,1,1-TCE use in auto mfg

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	not in scope
	Metric 4:	Temporal Representativeness	Low	× 2	6	1995
	Metric 5:	Sample Size	N/A		N/A	N/A - No data for dioxane
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.7.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. 1987. Health hazard evaluation report no. HETA-84-108-1821, Niemand Industries, Inc., Statesville, NC.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3974954

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	adhesive for paperwound packaging
Exposure Concentration (Unit):	7-14 ppm
Number of Samples:	22
Exposure Duration:	8-hr TWA

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	not in scope
	Metric 4:	Temporal Representativeness	Low	× 2	6	1987
	Metric 5:	Sample Size	High	× 1	1	22 samples
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.1.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Atsdr,. 2012. 1,4- Dioxane - ToxFAQs.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3978119

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	General public exposures

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	ToxFAQs
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	Consumer exposure information
	Metric 4:	Temporal Representativeness	High	× 2	2	2012
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.0.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Niosh,. 2014. International chemical safety cards (ICDC): 1, 4-dioxane.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3978147

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	All stages
Life Cycle Description (Subcategory of Use):	All life cycle stages
Route of Exposure:	inhalation, dermal

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	No engineering information.
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.0.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Sapphire, Group. 2007. Voluntary Children"s Chemical Evaluation Program [VCCEP]. Tiers 1, 2, and 3 Pilot Submission For 1,4-Dioxane.
Type of Data Source	Occupational Exposure; Completed Exposure or Risk Assessments;
Hero ID	3809038

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	All stages
Life Cycle Description (Subcategory of Use):	All life cycle stages
Exposure Concentration (Unit):	Table 6-1 (p.128) provides multiple datasets of PBZ sampling
Number of Sites:	52 companies (2004 TRI)
Worker Activity:	various activities
Number of Workers:	<10,000

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Ferro Corp submission for VCCEP
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	In scope, many of the sources for pbz data are other HERO sources already extracted
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2007
	Metric 5:	Sample Size	High	× 1	1	Multiple
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	M. T. Okawa, M. J. Coye. 1982. Health Hazard Evaluation Report, No. HETA-80-144-1109, Film Processing Industry, Hollywood, California.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1316845

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Film Cement
Life Cycle Description (Subcategory of Use):	Film Cement
Route of Exposure:	inhalation
Exposure Concentration (Unit):	less than 1 ppm
Number of Samples:	4 pbz, 1 area
Number of Sites:	2
Type of Measurement or Method:	pbz, area
Worker Activity:	splicing
Number of Workers:	4
Type of Sampling:	pbz, area
Exposure Duration:	6 hr

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Film cement, film splicing
	Metric 4:	Temporal Representativeness	Low	× 2	6	1982
	Metric 5:	Sample Size	High	× 1	1	2 sites, 3 workers
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty

Continued on next page

– continued from previous page

Source Citation:	M. T. Okawa, M. J. Coye. 1982. Health Hazard Evaluation Report, No. HETA-80-144-1109, Film Processing Industry, Hollywood, California.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	1316845

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	BASF. 2016. Analytical Reports and Data Summaries from Worker Monitoring at the US Facility for 1,4-Dioxane Production.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5079874

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing
Life Cycle Description (Subcategory of Use):	Manufacturing
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	provided in report, most less than 2 ug/sample
Number of Samples:	28
Number of Sites:	1
Type of Measurement or Method:	absorbant tubes, OVM badges
Exposure Duration:	lists time in minutes for each sample
Analytic Method:	NIOSH 1602

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	AIHA Accredited Laboratory for Industrial Hygiene, NIOSH 1602
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Domestic Manufacture
	Metric 4:	Temporal Representativeness	Medium	× 2	4	up to 2011
	Metric 5:	Sample Size	High	× 1	1	Representative sample size
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Provides method, supporting data
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	some discussion of variability
Overall Quality Determination†			High		1.3	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	BASF. 2017. Information in response to the "Preliminary information on manufacturing, processing, distribution, use, and disposal: 1,4-dioxane" document.
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	3827415

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing
Life Cycle Description (Subcategory of Use):	Manufacturing
Route of Exposure:	Inhalation
Exposure Concentration (Unit):	0.39 ppm (15-min STEL)<0.056 ppm (8-hr TWA)38 ppm (15-min STEL)0.23 ppm (8-hr TWA)
Number of Samples:	4
Number of Sites:	1
Worker Activity:	Routine duties, neutralization, evaporator dump
Exposure Duration:	15 min STEL, 8 hr TWA

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Monitoring by BASF
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Domestic Manufacture
	Metric 4:	Temporal Representativeness	High	× 2	2	2017
	Metric 5:	Sample Size	Medium	× 1	2	small sample size (4 points)
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	No discussion of methods, results, assumptions, etc.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion.
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	J. Huber. 2018. Roofing: A Guide to the Options.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	5080509

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Spray polyurethane foam
Worker Activity:	a typical two-story, 2,300-square-foothouse with a medium-pitch roof ” has a roof area of about 1,500 squarefeet

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	General estimates for roofing. Data sources not specified.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Spray Polyurethane Foam
	Metric 4:	Temporal Representativeness	High	× 2	2	2018
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	No discussion of methods, results, assumptions, etc.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion.
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	HomeAdvisor. 2018. How Much Do Asphalt Shingles & Roofs Cost To Install Or Replace?.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	5080525

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Spray polyurethane foam
Worker Activity:	an average size house is 1,500 square feet of roofing

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Low	× 1	3	General estimates for roofing. Data sources not specified.
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Spray Polyurethane Foam
	Metric 4:	Temporal Representativeness	High	× 2	2	2018
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	No discussion of methods, results, assumptions, etc.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion.
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	OMG Roofing Products. 2018. Product Data Specifications: OMG Olybond500 Insulation Adhesive.
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	5080523

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Spray polyurethane foam
Worker Activity:	Mix A-side and B-side in 1:1 ratio

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Company Product Specification Sheet
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Spray Polyurethane Foam
	Metric 4:	Temporal Representativeness	High	× 2	2	2018
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	No discussion of methods, results, assumptions, etc.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion.
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	GAF. 2014. Safety Data Sheet: OlyBond Part B (Amber/Red).
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	5080527

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Spray polyurethane foam
Worker Activity:	0.1 percent 1,4-dioxane in B-Side

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	SDS
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Spray Polyurethane Foam
	Metric 4:	Temporal Representativeness	High	× 2	2	2014
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	No discussion of methods, results, assumptions, etc.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion.
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	M. Stites. 2018. [RE: Discussion Follow-up].
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5099258

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Dry Film Lubrication
Physical Form:	liquid
Route of Exposure:	inhalation
Exposure Concentration (Unit):	<0.031 to 50 ppm
Number of Samples:	25
Number of Sites:	1
Type of Measurement or Method:	personal/area
Worker Activity:	Manufacture, Application - also provides specific activity descriptions
Type of Sampling:	personal/area
Exposure Duration:	varied
Engineering Control & percent Exposure Reduction:	Local exhaust hood
PPE:	Tyvek lab coat, butyl gloves, " face respirator with organic vapor cartridges, safety glasses with side shields, butyl gloves
Analytic Method:	NIOSH 1602/Direct Read (MiniRAE 2000)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Monitoring by DoE/KCNSC
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Dry film lubricants
	Metric 4:	Temporal Representativeness	High	× 2	2	2010 - 2014
	Metric 5:	Sample Size	High	× 1	1	Having individual samples allows full characterization of distribution
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Medium	× 1	2	Includes the most critical information, but lacks some metadata (exposure frequency, some sample durations are unclear)

Continued on next page

– continued from previous page

Source Citation:	M. Stites. 2018. [RE: Discussion Follow-up].
Type of Data Source	Occupational Exposure; Monitoring Data;
Hero ID	5099258

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Domain 4: Variability and Uncertainty					
	Metric 7: Metadata Completeness	Low	× 1	3	Data do not inform variability in exposures
Overall Quality Determination†		High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	M. Stites. 2018. [FW: 1,4-Dioxane].
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	5099257

EXTRACTION

Parameter	Data
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Dry Film Lubrication
Number of Sites:	8
Number of Workers:	up to 10: Approximately 3-4 employees work in the chemical material area where the dry film lubricant is formulated. Another 5-6 employees work in the paint shop where the dry film lubricant is spray applied.
Type of Sampling:	8-hr TWA
Engineering Control & percent Exposure Reduction:	Engineering controls (powered vented hoods) are employed which provide inhalation protection and dermal protection is provided by requiring chemical resistant gloves, safety glasses with side shields and lab apron when handling 1,4-Dioxane. Any exposure that might occur is well below regulatory action levels (reference previously provided personal and area monitoring data).

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Information provided by DoE/KCNSC
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Dry film lubricants
	Metric 4:	Temporal Representativeness	High	× 2	2	2018
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.

Continued on next page

– continued from previous page

Source Citation:	M. Stites. 2018. [FW: 1,4-Dioxane].
Type of Data Source	Occupational Exposure; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	5099257

EVALUATION

Domain	Metric	Rating	MWF*	Score	Comments
Overall Quality Determination†		High		1.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Facility

Source Citation:	Niosh,. 1977. Criteria for a recommended standard occupational exposure to dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	62937

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture
Process Description:	Manufacture of dioxane via dehydrogenation of ethylene glycol
Total Annual U.S. Volume (and percent of PV):	10 million pounds (1 large)5 million pounds (1 large)1 million pounds (1 small)
Number of Sites:	2 large and 2 small facilities
Possible Physical Form:	Liquid

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIOSH report
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Low	× 2	6	1977
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Nicnas,. 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.
Type of Data Source	Facility; Completed Exposure or Risk Assessments;
Hero ID	3827412

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Commercial Use
Life Cycle Description (Subcategory of Use):	Laboratory use
Total Annual U.S. Volume (and percent of PV):	500 kg

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NICNAS
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Australia
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1998
	Metric 5:	Sample Size	N/A		N/A	N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Nicnas,. 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.
Type of Data Source	Facility; Completed Exposure or Risk Assessments;
Hero ID	3827412

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Commercial, Potential Consumer Use
Life Cycle Description (Subcategory of Use):	Film Cement
Process Description:	Film is cut with special tool, the adhesive applied with a small brush (manually). Film joined and heated to 35 deg C to dry
Total Annual U.S. Volume (and percent of PV):	12 L (1 site)
Number of Sites:	Up to 10 film labs in Aus
Chemical Concentration:	10-50 percent

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NICNAS
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Australia
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1998
	Metric 5:	Sample Size	N/A		N/A	N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Nicnas,. 1998. 1, 4-Dioxane. Priority existing chemical assessment report No. 7.
Type of Data Source	Facility; Completed Exposure or Risk Assessments;
Hero ID	3827412

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Processing
Life Cycle Description (Subcategory of Use):	Pharmaceutical intermediate
Process Description:	Used in the reaction medium to produce pharmaceuticals
Total Annual U.S. Volume (and percent of PV):	100 kg
Number of Sites:	1

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NICNAS
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Australia
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1998
	Metric 5:	Sample Size	N/A		N/A	N/A. Assessment uses modeling to estimate occupational exposures; report does not include any monitoring data.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	ToxNet Hazardous Substances Data, Bank. 2017. HSDB: 1,4-Dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970270

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture
Life Cycle Description (Subcategory of Use):	Manufacture of dioxane via dehydrogenation of ethylene glycol
Process Description:	Manufactured commercially by dehydration and ring closure of diethylene glycol. Concentrated sulfuric acid is catalyst. Continurous process, dioxane vaporized and passed through an acid trap and two distillation columns to remove water and purify.
Number of Sites:	1
Chemical Concentration:	90 percent

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Process Description: Ullman's Encyclopedia of Industrial Chemistry Site: 2012 CDR
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Manufacturing
	Metric 4:	Temporal Representativeness	High	× 2	2	2012
	Metric 5:	Sample Size	N/A		N/A	Not applicable
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Cites sources clearly
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion/not applicable
Overall Quality Determination†			High		1.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	1996. Solvents study.
Type of Data Source	Facility; Completed Exposure or Risk Assessments;
Hero ID	3860540

EXTRACTION

Parameter	Data
Life Cycle Stage:	Processing, Use, Disposal
Life Cycle Description (Subcategory of Use):	Multiple, see p. 37 for a breakdown of the 27 total sites
Process Description:	Mutliple, see p. 37 and 28. Contains one or two-sentence descriptions of use of chemical within each industry
Total Annual U.S. Volume (and percent of PV):	101,577 kg/yr use for all 27 sites; contains breakdown of use by industry on p. 45
Number of Sites:	27, includes site locations
Site Daily Throughput:	Can be estimated based on total use and # of sites
Possible Physical Form:	liquid solvent

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US EPA Solvents Study, trusted source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Low	× 2	6	1993 RCRA 3007 Questionairre
	Metric 5:	Sample Size	Low	× 1	3	Distribution of samples is qualitative or characterized by no statistics
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			Medium		1.8	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	2017. Chemical data reporting: 1,4-Dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3860451

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	Manufacturing, use (non-incorporative activities), paints and coatings, laundry and dishwashing products
Number of Sites:	1 (manufacturing); 25-99 (non-incorp use); unknown for other uses
Possible Physical Form:	liquid

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US EPA CDR, trusted source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2017
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	Low	× 1	3	CDR Site data - underlying methods, sources, assumptions not transparaent
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Low	× 1	3	No discussion/not applicable
Overall Quality Determination†			High		1.6	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	1995. OPPT chemical fact sheets: 1, 4-Dioxane fact sheet: Support document.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3860496

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing
Life Cycle Description (Subcategory of Use):	manufacturing
Process Description:	contains information on various uses, see p. 2
Total Annual U.S. Volume (and percent of PV):	between 10,500,000 and 18,300,000 pounds (as of 1990)
Number of Sites:	3 (as of 1992)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US EPA OPPT Chemical Fact Sheet, trusted source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Low	× 2	6	1995 literature search
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Anderson, R. H.,Anderson, J. K.,Bower, P. A.. Co-occurrence of 1,4-dioxane with trichloroethylene in chlorinated solvent groundwater plumes at US Air Force installations: Fact or fiction. Integrated Environmental Assessment and Management.
Type of Data Source	Facility; Completed Exposure or Risk Assessments;
Hero ID	1065024

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	manufacturing, use as stabilizer in chlorinated solvents
Total Annual U.S. Volume (and percent of PV):	Between 1 and 10 million pounds annually
Possible Physical Form:	liquid
Chemical Concentration:	3.5 percent by volume for use as stabilizer

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	US Air Force Engineering Dept, trusted source
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2012
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Discusses variability, but not uncertainy
Overall Quality Determination†			High		1.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2015. TSCA work plan chemical problem formulation and initial assessment. 1,4-Dioxane.
Type of Data Source	Facility; Completed Exposure or Risk Assessments;
Hero ID	3809027

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	entire life cycle
Process Description:	source contains description of manufacturing, processing, and multiple uses
Total Annual U.S. Volume (and percent of PV):	Between 1 and 10 million pounds annually (as of 2006)
Number of Sites:	Lists one manufacturing site (BASF), which also reports processing and use of chemical
Possible Physical Form:	liquid, vapor

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	TSCA Work Plan Chemical
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	occupational scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	Medium	× 1	2	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Discusses variability, but not uncertainy
Overall Quality Determination†			High		1.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Atsdr,. 2012. Toxicological profile for 1,4-dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982333

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing
Life Cycle Description (Subcategory of Use):	Manufacturing
Process Description:	Manufactured in a closed system by acid catalyzed conversion of diethylene glycol via dehydration and ring closure
Total Annual U.S. Volume (and percent of PV):	1-10 million lbs in 2002
Number of Sites:	2 sites (DOW in TX and Ferro Corp in LA)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	ATSDR Toxicological Profile
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2012
	Metric 5:	Sample Size	High	× 1	1	TRI Sites
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Discusses variability, but not uncertainy
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Atsdr,. 2012. Toxicological profile for 1,4-dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982333

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	entire life cycle
Number of Sites:	Source lists number of facilities by state that produce, process, or use Dioxane. Also identifies lifecycle stage. Based on TRI data from 2007

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	ATSDR Toxicological Profile
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2012
	Metric 5:	Sample Size	High	× 1	1	TRI Sites
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Discusses variability, but not uncertainy
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Nih,. 2016. Report on carcinogens: 1,4-Dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982327

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, and use
Life Cycle Description (Subcategory of Use):	entire life cycle
Total Annual U.S. Volume (and percent of PV):	1-10 million lbs between 1994 and 2006
Number of Sites:	1 mfg, 26 US Suppliers (2009)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Department of Health and Human Services NTP
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2016
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ec,. 2004. Recommendation from the Scientific Committee on Occupational Exposure Limits for 1,4-dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3827409

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing
Life Cycle Description (Subcategory of Use):	Manufacturing
Process Description:	acid-catalysed conversion ofdiethylene glycol by ring closure in a closed system
Total Annual U.S. Volume (and percent of PV):	10,000 tonnes/yr (global)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	European CommissionEmployment, Social Affairs and Inclusion
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Global mfg data (not just US mfg)
	Metric 3:	Applicability	High	× 2	2	Scenario within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Low	× 2	6	Paper is from 2004, but global PV data is from 1995
	Metric 5:	Sample Size	High	× 1	1	Global Data for all producers at the time
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	States that in general the global production is decreasing
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Environment Canada, Health Canada. 2010. Screening assessment for the challenge 1,4-dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3981144

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture, import, processing, use
Life Cycle Description (Subcategory of Use):	entire life cycle
Total Annual U.S. Volume (and percent of PV):	10,000-100,000 kg mfg10,000-100,000 kg import10,000-100,000 kg used

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Environment Canada/Health Canada
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Canada
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2010
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 1978. OAQPS guideline series: Control of volatile organic emissions from manufacture of synthesized pharmaceutical products.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970050

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Industrial Use - Pharmaceuticals
Process Description:	Series of batch operations: reaction(s), product separation, purification, and drying. Gives info on equipment used on page 2-1 and Ch 3, PFD Figure 2-1
Number of Sites:	800 Pharmaceutical plants in the US and territories

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA OAQPS
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Low	× 2	6	1978
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty - states generalizations are difficult since there is a lot of variability between plants and volumes of chemicals used
Overall Quality Determination†			High		1.5	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.
Type of Data Source	Facility; Completed Exposure or Risk Assessments;
Hero ID	196351

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing
Life Cycle Description (Subcategory of Use):	Manufacturing
Process Description:	dehydration and ring closure of diethylene glycol. Process temperature varies from 130-200"C, under atmospheric pressure. The process is continuous
Number of Sites:	1 site in EU

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2002
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ecjrc,. 2002. European Union risk assessment report: 1,4-dioxane. 2nd Priority List.
Type of Data Source	Facility; Completed Exposure or Risk Assessments;
Hero ID	196351

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	All life cycle stages
Chemical Concentration:	Gives various concentrations for different uses (pg. 37).

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	European Chemicals Bureau
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2002
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Aca,. 2015. Re: TSCA Work Plan Chemical Problem Formulaton and Initial Assessment for 1,4-Dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3809105

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, Processing
Life Cycle Description (Subcategory of Use):	Manufacturing, Processing
Total Annual U.S. Volume (and percent of PV):	1-10 million pounds (2006 CDR)
Number of Sites:	1 mfg25-99 Proc
Chemical Concentration:	>90 percent

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	2015 PF (US EPA)
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Clear documentation of data sources, methods, results and assumptions
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	High	× 1	1	clear documentation of variability and uncertainty
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Pubchem,. 2017. PubChem: 1,4-Dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970246

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing
Life Cycle Description (Subcategory of Use):	Manufacturing
Process Description:	Dehydration and ring closure of diethylene glycol. Concentrated acid used as a catalyst. Continuous process.
Chemical Concentration:	>90 percent

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	NIH - PubChem
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2017
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Lists data sources
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2017. Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: 1,4-Dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3986663

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture, Import
Life Cycle Description (Subcategory of Use):	Manufacture, Import
Process Description:	Conc. Sulfuric acid used as catalyst. Temps from 130 to 200 deg C, pressure from 25-110 kPa. Continuous.
Number of Sites:	1 mfg1 import

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA Use Dossier
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2017
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Lists data sources
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	U.S, E. P. A.. 2017. Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: 1,4-Dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3986663

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	Manufacturing, processing, use
Number of Sites:	25 mfg0 import13 proc21 other uses (2015 TRI)
Chemical Concentration:	Provides table of SDS's with some conc. Information

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	EPA Use Dossier
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	Scenarios within the scope of the risk evaluation
	Metric 4:	Temporal Representativeness	High	× 2	2	2017
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	High	× 1	1	Lists data sources
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	Medium	× 1	2	Limited discussion of variability and uncertainty
Overall Quality Determination†			High		1.1	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Ashford, R. D.. 2001. Ashford's Dictionary of Industrial Chemicals.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3859379

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	All stages
Life Cycle Description (Subcategory of Use):	All life cycle stages

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Ashford's Dictionary of Industrial Chemicals
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	England
	Metric 3:	Applicability	Unacceptable	× 2	8	Just some basic physical properties information. Nothing useful.
	Metric 4:	Temporal Representativeness	Low	× 2	6	1994
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.8.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Echa,. 2017. 1,4-Dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970664

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacture, Import
Life Cycle Description (Subcategory of Use):	Manufacture, Import
Total Annual U.S. Volume (and percent of PV):	MFG/import: 1,000+ tonnes (EU)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	ECHA
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	Unacceptable	× 2	8	MFG/import estimate for the EU (1000+ tonnes), other general hazard and use information.
	Metric 4:	Temporal Representativeness	High	× 2	2	2017
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.2.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Oecd Exisiting Chemical Database. 1999. SIDs initial assessment profile: 1,4-Dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970845

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	Manufacturing, processing, use
Total Annual U.S. Volume (and percent of PV):	8,000 - 10,000 tons (worldwide production)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	SIDS Initial Assessment profile
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Australia
	Metric 3:	Applicability	Unacceptable	× 2	8	No useful information
	Metric 4:	Temporal Representativeness	Medium	× 2	4	1999
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.5.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	The Commission of the European, Communities. 2002. Commission recommendation on the results of risk evaluation and the risk reduction strategies for the substances: o-anisidine, 1,4,-dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3970846

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	Manufacturing, processing, use

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	The Commission of the European Communities
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	EU
	Metric 3:	Applicability	Unacceptable	× 2	8	Recommendations in response to 2002 EU Risk Assessment
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2002
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.5.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Franz, C.,Bennett, S.,DeLeo, P. C.,Collatz, M.,Kelly, K.,Nekoomaram, J.,Wieroniey, S.. 2015. Comments of the Adhesive and Sealant Council, the American Coatings Association, the American Chemistry Council, the American Cleaning Institute, the Consumer Specialty Products Association, and Waste Management on the 1,4-dioxane problem formulation and initial assessment.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3986506

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	All stages
Life Cycle Description (Subcategory of Use):	All life cycle stages

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Public Comment from Industry Groups
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	Unacceptable	× 2	8	General comments on previous problem formulation. No useful information
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Unacceptable		4.0	Metric Mean Score: 2.0.

** Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	MakerBot Industries LLC. 2015. Safety data sheet: PLA 3D printer filament/MakerBot PLA.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	5160198

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Printing
Chemical Concentration:	>98 percent chemical that contains dioxane

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	SDS
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	3D printing
	Metric 4:	Temporal Representativeness	High	× 2	2	2016
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.0	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Y. He, S. Kilsby, C. J. Tuck, R. D. Wildman, S. D. R. Christie, S. Edmondson, H. Yang. 2013. Processing Biodegradable Polycaprolactone through 3D Printing. 24th International SFF Symposium - An Additive Manufacturing Conference.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	5080531

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Printing
Process Description:	PCL flakes dissolved in 99.8 percent 1,4-dioxane. Ink samples settled for 24 hrs then stirred at 800rpm. Slides soaked in 2-propanol and dried. 2mL of ink injected in cartridges.
Chemical Concentration:	99.8 percent , but then mixed with PCL flakes to 5-10 percent PCL

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Research article
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	UK
	Metric 3:	Applicability	High	× 2	2	3D printing
	Metric 4:	Temporal Representativeness	High	× 2	2	2013
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	F. Ruggiero, P. A. Netti, E. Torino. 2015. Experimental Investigation and Thermodynamic Assessment of Phase Equilibria in the PLLA/Dioxane/Water Ternary System for Applications in the Biomedical Field. Langmuir.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3538358

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Printing
Process Description:	PLLA pellets added to dioxane and heated in a silicone oil bath. Condenser prevents dioxane vapors from escaping during heating.
Chemical Concentration:	Pure dioxane mixed with PLLA (0.5 percent , 1 percent , and 1.5 percent w/v)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Research article
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Italy
	Metric 3:	Applicability	High	× 2	2	3D printing
	Metric 4:	Temporal Representativeness	High	× 2	2	2015
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Y. He, R. D. Wildman, C. J. Tuck, S. D. Christie, S. Edmondson. 2016. An Investigation of the Behavior of Solvent based Polycaprolactone ink for Material Jetting. Scientific Reports.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3829109

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	Printing
Process Description:	PCL flakes dissolved in 99.8 percent 1,4-dioxane. Ink samples settled for 24 hrs then stirred at 800rpm. Slides soaked in 2-propanol and dried. 2mL of ink injected in cartridges.
Chemical Concentration:	99.8 percent dioxane mixed with PCL (5 wt percent)

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	High	× 1	1	Research article
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	UK
	Metric 3:	Applicability	High	× 2	2	3D printing
	Metric 4:	Temporal Representativeness	High	× 2	2	2016
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Independent Lubricant Manufacturers, Association. 2014. RE: Proposition 65 warning regulation.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3982411

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Use
Life Cycle Description (Subcategory of Use):	MWF
Chemical Concentration:	<1 ppb

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Public Comment from Industry Groups
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	MWF
	Metric 4:	Temporal Representativeness	High	× 2	2	2014
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.2	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Spin,. 2017. SPIN substances in preparations in nordic countries 1,4,-dioxane.
Type of Data Source	Facility; Reports for Data or Information Other than Exposure or Release Data;
Hero ID	3981126

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing, processing, use
Life Cycle Description (Subcategory of Use):	Manufacturing, processing, use
Total Annual U.S. Volume (and percent of PV):	PV for different Nordic countries by industry in 2010-2014

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	SPIN
Domain 2: Representative						
	Metric 2:	Geographic Scope	Medium	× 1	2	Nordic Countries
	Metric 3:	Applicability	Medium	× 2	4	Many industries listed are not in scope
	Metric 4:	Temporal Representativeness	High	× 2	2	2010-2014
	Metric 5:	Sample Size	N/A		N/A	No Comment.
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			Medium		1.7	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.

Source Citation:	Sapphire, Group. 2007. Voluntary Children"s Chemical Evaluation Program [VCCEP]. Tiers 1, 2, and 3 Pilot Submission For 1,4-Dioxane.
Type of Data Source	Facility; Completed Exposure or Risk Assessments;
Hero ID	3809038

EXTRACTION

Parameter	**Data**
Life Cycle Stage:	Manufacturing
Life Cycle Description (Subcategory of Use):	Manufacturing
Process Description:	3 methods for mfg
Total Annual U.S. Volume (and percent of PV):	mfg: 1 million lbs (2003)import: <50,000 lbs (2001)
Number of Sites:	1 site in US
Chemical Concentration:	99.90 percent

EVALUATION

Domain	Metric		Rating	MWF*	Score	Comments
Domain 1: Reliability						
	Metric 1:	Methodology	Medium	× 1	2	Ferro Corp submission for VCCEP
Domain 2: Representative						
	Metric 2:	Geographic Scope	High	× 1	1	US
	Metric 3:	Applicability	High	× 2	2	In scope
	Metric 4:	Temporal Representativeness	Medium	× 2	4	2007
	Metric 5:	Sample Size	High	× 1	1	Multiple
Domain 3: Accessibility/Clarity						
	Metric 6:	Metadata Completeness	N/A		N/A	No Comment.
Domain 4: Variability and Uncertainty						
	Metric 7:	Metadata Completeness	N/A		N/A	No Comment.
Overall Quality Determination†			High		1.4	

* MWF = Metric Weighting Factor

† If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High: ≥ 1 to < 1.7; Medium: ≥ 1.7 to < 2.3; Low: ≥ 2.3 to ≤ 3.